
شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم


# شبكة المعلومات الجامعية

# التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

## يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

**To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%**

# بعض الوثائق الاصلية تالفة

# بالرسالة صفحات لم ترد بالاصل

ZAGAZIG UNIVERSITY
BENAH BRANCH
FACULTY OF SCIENCE

# *EFFECT OF COMPOSITION AND TEMPERATURE ON THE ELECTRICAL CONDUCTION AND DIELECTRIC PROPERTIES OF SILVER PHOSPHITE GLASS*



Thesis
SUBMITTED FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY
"SOLID STATE PHYSICS"

By
***SOLIMAN MOHAMMED SOLIMAN***
*B. Sc. & M. Sc.*

To
Physics Department
Faculty Of Science
Benha – Zagazig University

Supervised By

***Dr. M.K.EL-MANSY***
Assist . Prof. of solid physics
Zagazig university – Benha

***Dr. F.E. SALMAN***
Assist . Prof. of solid physics
Zagazig university – Benha

1998

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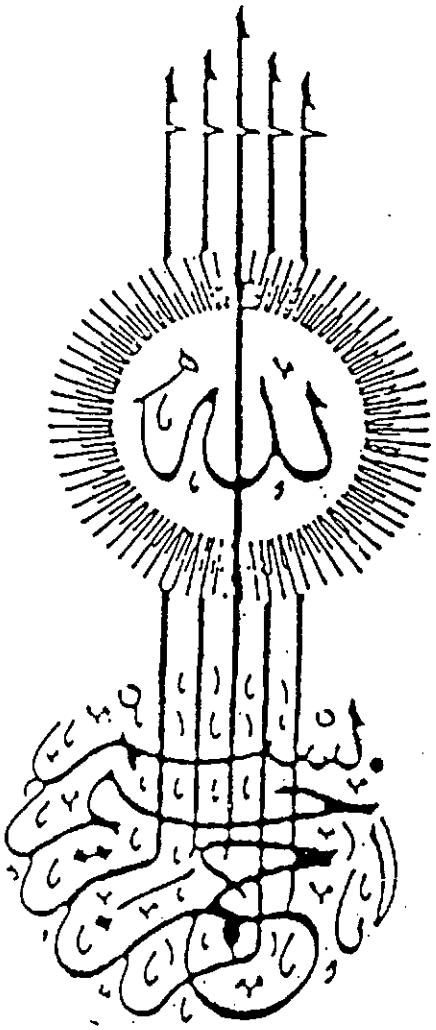
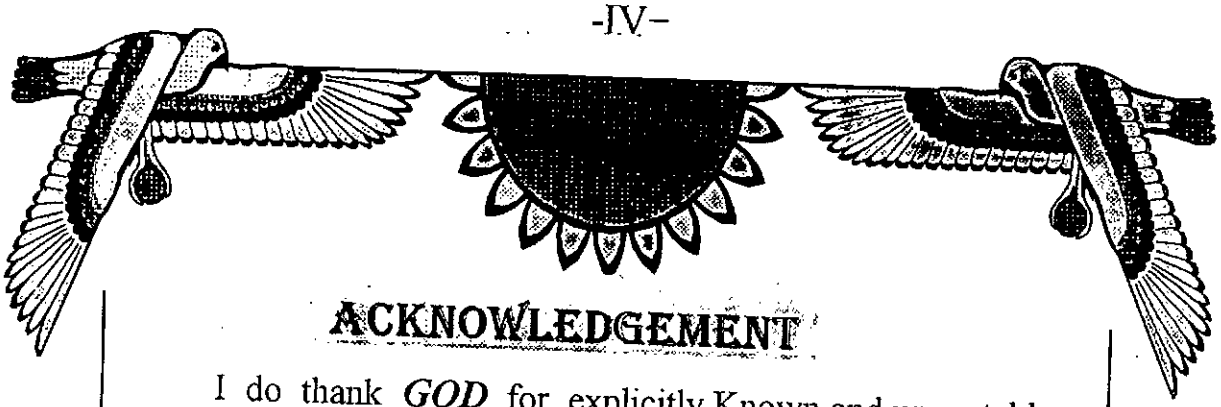


قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ .

صدق الله العظيم
البقرة - ٣٢ -




## ACKNOWLEDGEMENT

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*(Soliman Mohamed Soliman)*

# ABSTRACT

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A method which has been recently used to correlate the structure and properties of various types of superionic glasses is,the composition transformations. It can be successfully used to rationalize the observed properties of the materials , as well as to predict citria for selecting materials with desirable properties .

The glass systems $(1-x)AgPO_3$-$xAgM^-$, [$M^-$=I,Cl,Br]

$AgPO_3$ x= 0.0

$(1-x)AgPO_3 - xAgI$ , $0.1 \leq x \leq 0.5$

$(1-x)AgPO_3 - xAgCl$ , $0.1 \leq x \leq 0.4$

$(1-x)AgPO_3 - xAgBr$ , $0.1 \leq x \leq 0.4$

are considered for the present study .

X- ray diffraction study for all samples exhibits amorphous nature.

Differential Thermal Analysis (DTA) reveals that the characteristic temperatures of the glasses,($T_g$ , $T_c$ and $T_m$),are vary with glass type and composition .

AC conductivity , $\sigma_{tot}$ , of glasses are studied as a function of frequency. (0.1– 100KHz) in temperature range (298–450K). The obtained data obey the following relation , $\sigma_{tot} = \sigma(0) + A\omega^s$ .

The exponent, s, was found to decrease with temperature increase in the case of pure $AgPO_3$ glass, whereas it increases with temperature up to 373K and varies irregularly in the temperature range(373–450K) for the doped glasses .

The DC conductivity, $\sigma_{dc}$ , of the glasses are studied as a function of temperature which obeys Arrhenius plot . The values of DC conductivity and activation energies confirms the semiconducting nature of the glasses .The obtained results suggest, in general the ionic conduction .

The obtained bulk conductivity , $\sigma_{bl}$ , are studied at various ambient temperatures; the relation between log $\sigma_{bl}$ and $10^3/T$ , obeys an Arrhinous relation, which reveal that there is one conduction mechanism at high frequencies (bulk properties) .

The study of the dielectric parameters,( $\epsilon'$ , $\epsilon''$, and tan$\delta$ ), as a function of frequency in the temperature rang (298–430K) illustrate the domination of ionic polarization as well as the interfacial polarization .

The estimation of the carrier concentration shows that the concentration of $Ag^+$ ions contributing in conduction and polarization which increases with increasing silver halid concentration in the glass matrix .

The calculation of the ion diffusion length in the glasses , it is found that it increases with temperature increasing whereas it decreases with the further increases of silver halid concentration .

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